



Patient education: Pulmonary embolism (blood clot in the lung) (The Basics)

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What is a pulmonary embolism?

A pulmonary embolism ("PE") is a blockage in 1 or more of the blood vessels that supply blood to the lungs. Most often, these blockages are caused by blood clots that form somewhere else and then travel to the lungs. In rare cases, blockages can also be caused by air bubbles, tiny globs of fat, or pieces of tumor that travel to the lungs.

Why are blood clots dangerous?

If a blood clot forms or gets stuck inside a blood vessel, it can clog the vessel and keep blood from getting where it needs to go. When that happens in the lungs, the lungs can get damaged. Having blocked arteries in the lung can also make it hard to breathe and can even lead to death.

Most blood clots in the lungs actually form in the legs or pelvic area and then travel to the lungs. When a clot forms in the deep veins of the leg, it is called "deep vein thrombosis" ("DVT") ([figure 1](#)). DVT can cause swelling, pain, warmth, and redness in the leg. If you have any of these symptoms, it's important to see a doctor right away. They can do tests to find out if you do have a clot and where it is. There are treatments that can help prevent a clot from getting bigger and traveling to the lungs.

What are the symptoms of blood clots in the lungs?

Common symptoms include:

- Panting, shortness of breath, or trouble breathing
- Sharp, knife-like chest pain when you breathe in or strain
- Coughing or coughing up blood
- Rapid heartbeat

If you get any of these symptoms, especially if they happen over a short period of time (hours or days) or get worse quickly, **call for an ambulance** (in the US and Canada, **call 9-1-1**). At the hospital, doctors can do tests to find out if you do have a clot. Blood clots in the lungs can lead to death. That's why it's important to act fast and find out if there is a clot.

Is there a test for PE?

Yes. There are several tests that doctors can use to find out if a person has a blood clot in a lung. The most common tests include:

- D-dimer blood test – D-dimer is a substance in the blood. The amount of D-dimer often goes up in people with a blood clot in a lung. This blood test is often done together with other tests.
- CT pulmonary angiography ("CT-PA") – A CT pulmonary angiogram is a special kind of X-ray that uses computers. During this test, a dye is injected into 1 of your veins. The dye shows up on X-rays and can show if any blood vessels are blocked.
- Ventilation/perfusion lung scan ("V/Q scan") – For this test, you breathe in a small amount of a radioactive substance. You also have a radioactive dye injected into 1 of your veins. Then, doctors look at how the different substances look on the scan. The scan can show if 1 of the arteries in the lung is blocked.

Less commonly, other tests are done, such as:

- Pulmonary angiography – For this test, you have a small tube called a catheter inserted into 1 of the large veins in your body, usually in your leg. Then, doctors gently push this tube up into your chest to where the major blood vessels of the lung are found. When the tube is in place, the doctors inject a dye that shows up on an X-ray.
 - MRI pulmonary angiography ("MRI-PA") – An MRI is an imaging test that uses a magnet to create pictures. During this test, a dye is injected into 1 of your veins. The dye shows up on X-rays and can show if any blood vessels are blocked.
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How is a PE treated?

Blood clots in the lungs are treated with medicines that keep clots from getting bigger. These medicines are called "anticoagulants." They are sometimes also called "blood thinners," although they do not actually thin the blood. Some come in shots, and others come in pills. PE is usually treated first in the hospital.

- If you have had a clot, your doctor will prescribe an anticoagulant medicine to lower your risk of getting more clots in the future. You will need to take the medicine for at least 3 months (and sometimes longer). Some people are first given a medicine that comes as a shot, called heparin. You might get this shot for a few days, or longer if for some reason you can't take pills.
- The medicines do not dissolve existing blood clots, but they do keep them from getting bigger. They also help keep new blood clots from forming. Taking the medicine for a few months is important because it gives your body time to dissolve the old clot. It's also important because people who have a clot are at risk of developing another clot, especially in the first few months.
- There are different oral medicines (pills) used to prevent and treat blood clots. They include [apixaban](#) (brand name: Eliquis), [dabigatran](#) (brand name: Pradaxa), [edoxaban](#) (brand names: Savaysa, Lixiana), [rivaroxaban](#) (brand name: Xarelto), and [warfarin](#) (brand name: Jantoven). Each medicine is different in the dose, how often you take it, the cost, and how your diet or other medicines might affect it ([table 1](#)). Your doctor can talk to you about your options and preferences.

If your doctor prescribes 1 of these medicines:

- Take it exactly as your doctor tells you to – If you forget or miss a dose, call your doctor to find out what to do. When you start taking the medicine, you will need to have your blood tested. If you take [warfarin](#), you will need regular blood tests to check how your blood is clotting. This is important to make sure that you get the correct dose of warfarin for you.
- Follow your doctor's instructions about diet and medicines – Depending on which medicine you take, you might need to pay special attention to what you eat. Also, certain other medicines can affect the way these medicines work.
- Watch for signs of bleeding – Abnormal bleeding is a risk with any of the medicines used to prevent and treat blood clots. That's because while these medicines help prevent dangerous blood clots, they also make it harder for your body to control bleeding after an injury. Try to avoid getting injured, and tell your doctor right away if you do have signs of bleeding.

People who cannot take medicines to prevent and treat clots, or who do not get enough benefit from the medicines, can get a different treatment. This is called an "inferior vena cava filter" ("IVC filter"). The inferior vena cava is the large vein that carries blood from your legs and the lower half of your body back up to your heart. IVC filters go inside the inferior vena cava. They filter and trap any large clots that form below the location of the filter. Your doctor might suggest this if:

- You cannot safely take a medicine for blood clots.
- You form clots even while taking a medicine for blood clots.
- You have a dangerous bleeding problem while taking a medicine for blood clots.
- Your lungs and heart might not be able to handle another PE.

In some cases, a severe clot can cause low blood pressure and even shock. (Shock is when blood pressure gets too low, and not enough blood can get to the body's organs and tissues.) If this happens, doctors can give medicine to dissolve the clot. This is sometimes called "clot-busting" medicine, and is given through a catheter (a small tube inserted into the vein). In some cases, doctors will do surgery to remove the clot.

Can I do anything on my own to prevent blood clots?

Yes. People sometimes form clots because they have been sitting still for too long. People who travel on long airplane flights, for example, are at increased risk of blood clots. Some things that you can do to help prevent a clot during a long flight include:

- Stand up and walk around at least once every hour.
- Do not smoke just before your trip.
- Wear loose, comfortable clothes.
- Shift your position while seated, and move your legs and feet often.
- Wear knee-high compression stockings.
- Avoid alcohol and medicines that make you sleepy, because they can impair your ability to move around.

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[Patient education: Anticoagulant medicines – Uses and kinds \(The Basics\)](#)

[Patient education: How to take anticoagulants safely \(The Basics\)](#)

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GRAPHICS

Deep veins of the leg



In people with deep vein thrombosis, blood clots can form in the deep veins of the legs (shown in blue).

Graphic 70603 Version 2.0

Common questions about the different oral anticoagulant medicines

	Warfarin (brand name: Jantoven, also known as Coumadin in some places)	Dabigatran (brand name: Pradaxa)	Apixaban (brand name: Eliquis)	Edoxaban (brand names: Savaysa, Lixiana)	Rivaroxaba (brand name: Xarelto)
How often do I take it?	Once a day.	Once or twice a day, depending on why you are taking it.	Once or twice a day, depending on why you are taking it. Some people might need to take a higher dose twice a day for the first week, then switch to a lower dose twice a day.	Once a day.	Once a day. Some people might need to take a lower dose twice a day for the first 3 weeks, then switch to a higher dose once a day.
Do I need regular blood tests?	Yes.	No.	No.	No.	No.
Will the dose need to be adjusted?	When you first start warfarin, the dose usually needs to be adjusted to find the right dose for you. Later, it might be changed depending on the results of your blood tests.	No. Once you are on a stable dose, you do not need to adjust the dose.	No. Once you are on a stable dose, you do not need to adjust the dose.	No. Once you are on a stable dose, you do not need to adjust the dose.	No. Once you are on a stable dose, you do not need to adjust the dose.
What happens if	It's not as risky as with the other anticoagulants.	You might not be as well protected if you miss a	You might not be as well protected if you miss a	You might not be as well protected if you miss a	You might not be as well protected if you miss a

I miss a dose?	Ask your doctor, pharmacist, or anticoagulation clinic what to do if you miss a dose.	dose. Ask your doctor or pharmacist what to do if you miss a dose.	dose. Ask your doctor or pharmacist what to do if you miss a dose.	dose. Ask your doctor or pharmacist what to do if you miss a dose.	dose. Ask your doctor or pharmacist what to do if you miss a dose.
Could it cause serious bleeding?	Yes.	Yes, but the risk might be less than with warfarin.	Yes, but the risk might be less than with warfarin.	Yes, but the risk might be less than with warfarin.	Yes, but the risk might be less than with warfarin.
Is there a medicine to reverse the effects if I have serious bleeding?	Yes.	Yes.	Yes.	Yes.	Yes.
Do I need to do anything special about my diet while taking it?	Yes. You need to be careful about keeping the amount of vitamin K in your diet similar over time. If you eat foods high in vitamin K, you need to do that consistently. Your doctor, pharmacist, or anticoagulation clinic can give you a list of foods high in vitamin K.	No.	You need to avoid grapefruit and grapefruit juice, which can change the way the medicine works.	No.	You need to avoid grapefruit and grapefruit juice, which can change the way the medicine works. If you take rivaroxaban for atrial fibrillation ("A fib"), you need to take it with your evening meal. If you take rivaroxaban (for any reason) and the strength of your pills is 15 or 20 mg, you need to take it with food.
What if I have	OK to take.	Might need to avoid if you	Might need to avoid if you	Might need to avoid if you	Might need to avoid if you

<p>kidney or liver disease?</p>		<p>have severe kidney disease.</p>	<p>have severe liver disease.</p>	<p>have severe liver or kidney disease or increased kidney function.</p>	<p>have moderate to severe liver disease or severe kidney disease.</p>
<p>What if I take other medicines?</p>	<p>Many medicines can affect the dose of warfarin needed. Talk to your doctor if you are prescribed a new medicine.</p> <p>Avoid aspirin and "NSAID" medicines. Most people can use acetaminophen (paracetamol) for pain or fever.</p> <p>Many herbs, including ginkgo, green tea, and garlic pills, could increase the risk of bleeding with anticoagulant medicines.</p> <p>Avoid St. John's Wort.</p>	<p>A few medicines can affect the dose of the anticoagulant.</p> <p>Avoid aspirin and "NSAID" medicines unless advised by your doctor. Most people can use acetaminophen (paracetamol) for pain or fever.</p> <p>Many herbs, including ginkgo, green tea, and garlic pills, could increase the risk of bleeding with anticoagulant medicines.</p> <p>Avoid St. John's Wort.</p>	<p>A few medicines can affect the dose of the anticoagulant.</p> <p>Avoid aspirin and "NSAID" medicines unless advised by your doctor. Most people can use acetaminophen (paracetamol) for pain or fever.</p> <p>Many herbs, including ginkgo, green tea, and garlic pills, could increase the risk of bleeding with anticoagulant medicines.</p> <p>Avoid St. John's Wort.</p>	<p>A few medicines can affect the dose of the anticoagulant.</p> <p>Avoid aspirin and "NSAID" medicines unless advised by your doctor. Most people can use acetaminophen (paracetamol) for pain or fever.</p> <p>Many herbs, including ginkgo, green tea, and garlic pills, could increase the risk of bleeding with anticoagulant medicines.</p> <p>Avoid St. John's Wort.</p>	<p>A few medicines can affect the dose of the anticoagulant.</p> <p>Avoid aspirin and "NSAID" medicines unless advised by your doctor. Most people can use acetaminophen (paracetamol) for pain or fever.</p> <p>Many herbs, including ginkgo, green tea, and garlic pills, could increase the risk of bleeding with anticoagulant medicines.</p> <p>Avoid St. John's Wort.</p>
<p>Can I drink alcohol while taking it?</p>	<p>How much alcohol you drink in a day can affect your warfarin dose. Limit alcohol to no more than 2 drinks per day (for males) or 1 drink a day (for females). Do</p>	<p>Avoid excess alcohol.</p>	<p>Avoid excess alcohol.</p>	<p>Avoid excess alcohol.</p>	<p>Avoid excess alcohol.</p>

	not binge drink (have many drinks at once).				
What if I am pregnant?	<p>Most people are switched to a different medicine that comes as a shot.</p> <p>Warfarin can cause serious problems with a baby's development, especially when taken early in the pregnancy. Talk to your doctor right away if you are taking warfarin and think you are pregnant or want to get pregnant. They will work with you to make a plan.</p>	<p>Most people are switched to a different medicine that comes as a shot.</p> <p>Talk to your doctor right away if you are taking dabigatran and think you are pregnant or want to get pregnant. They will work with you to make a plan.</p>	<p>Most people are switched to a different medicine that comes as a shot.</p> <p>Talk to your doctor right away if you are taking apixaban and think you are pregnant or want to get pregnant. They will work with you to make a plan.</p>	<p>Most people are switched to a different medicine that comes as a shot.</p> <p>Talk to your doctor right away if you are taking edoxaban and think you are pregnant or want to get pregnant. They will work with you to make a plan.</p>	<p>Most people are switched to a different medicine that comes as a shot.</p> <p>Talk to your doctor right away if you are taking rivaroxaban and think you are pregnant or want to get pregnant. They will work with you to make a plan.</p>

These are some common questions about the different oral anticoagulants. Your doctor will talk to you about which medicine is best for your situation.

Graphic 99882 Version 10.0

